FANUC Open Architecture Update

Claude Dinsmoor

General Manager

Controller Software Development

FANUC Robotics

Open Should mean:
Interoperability

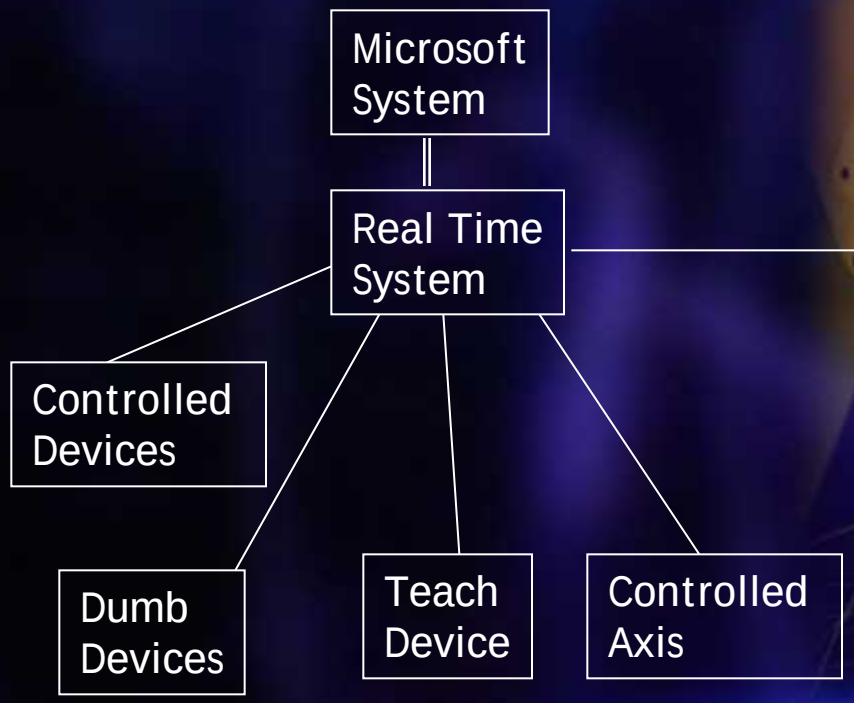
OMAC Definition:

"..a commitment to A PLATFORM + OPERATINGYSTEM + COMPILER + LOADER + INFRASTRUCTURE SUITE is necessary for it to be possible to swap modules."

Definition:

Plug and play interconnection with peripheral equipment, plant data systems and graphic displays.

Peripheral Integration



Smart Devices

Weld Controllers

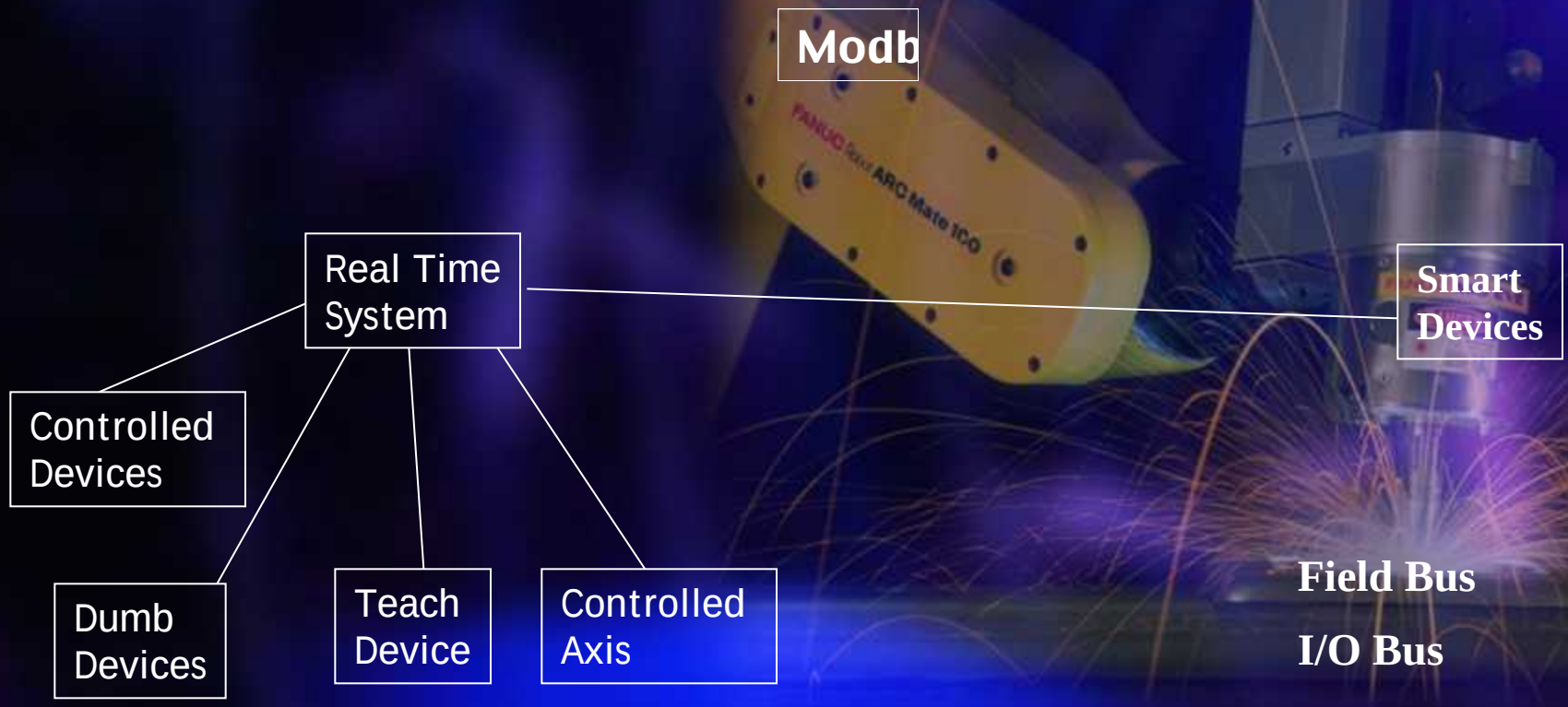
Dispense Controllers

PLC's

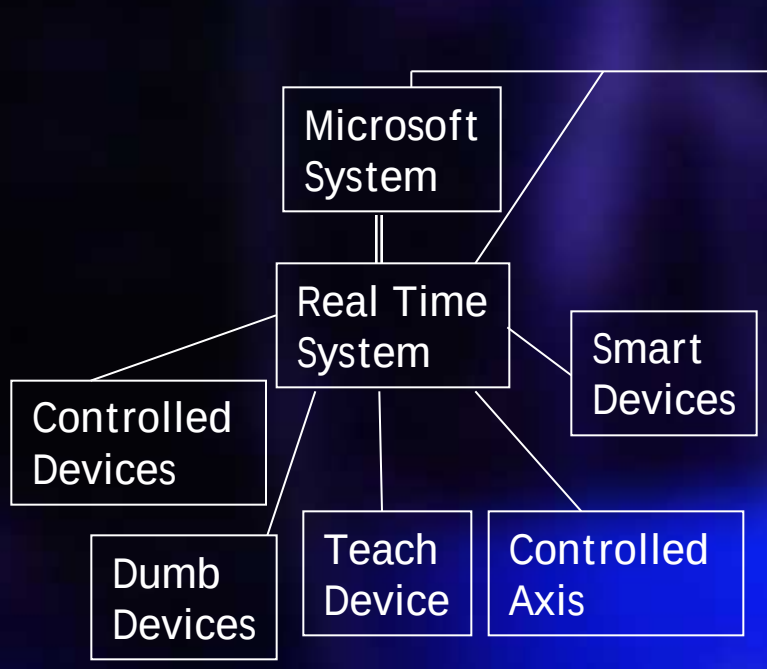
Smart Sensors

Plug and Play Peripheral Integration

The Industrial
Single word Oxymoron:



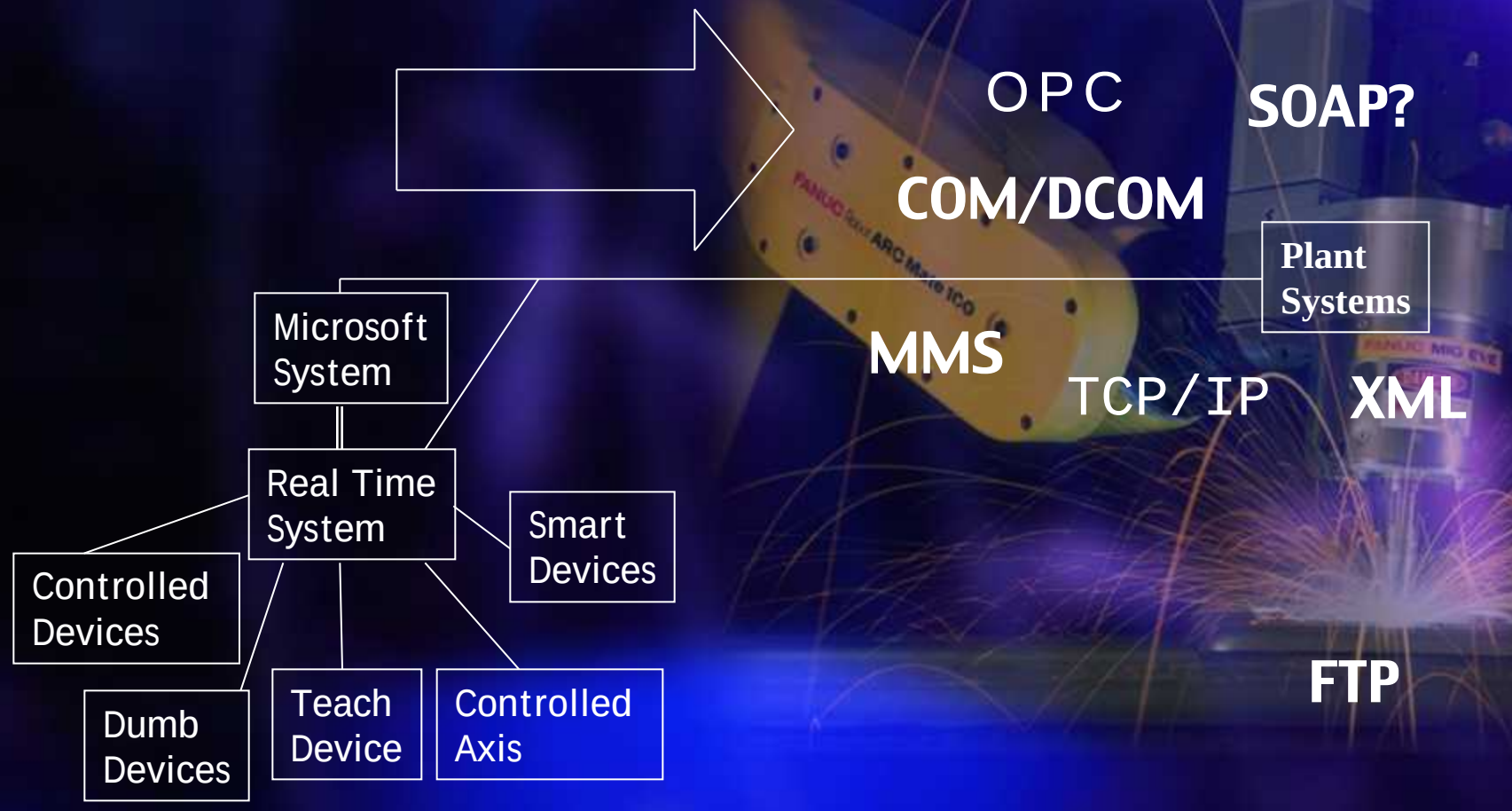
Integration with Plant Systems



Plant Systems

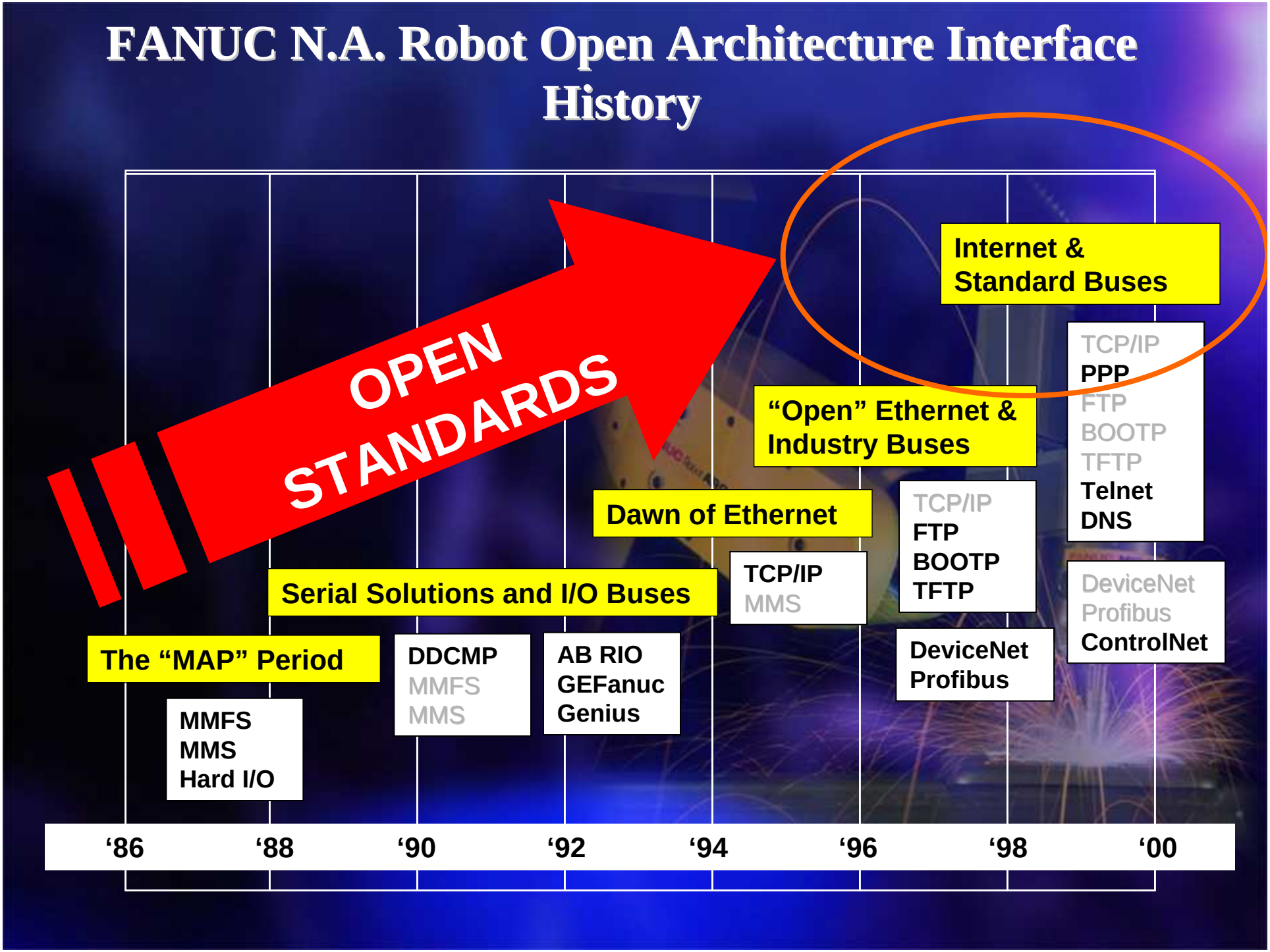
File Backup
Process Data
Alarms
Status

Plug and Play Integration with Plant Systems



Where Have We Been?

FANUC N.A. Robot Open Architecture Interface History



“Legacy” Products

Industrial I/O

- AB RIO : Distributed Process Control (Slave)
- Genius : Distributed Process Control

Data Exchange and Networking

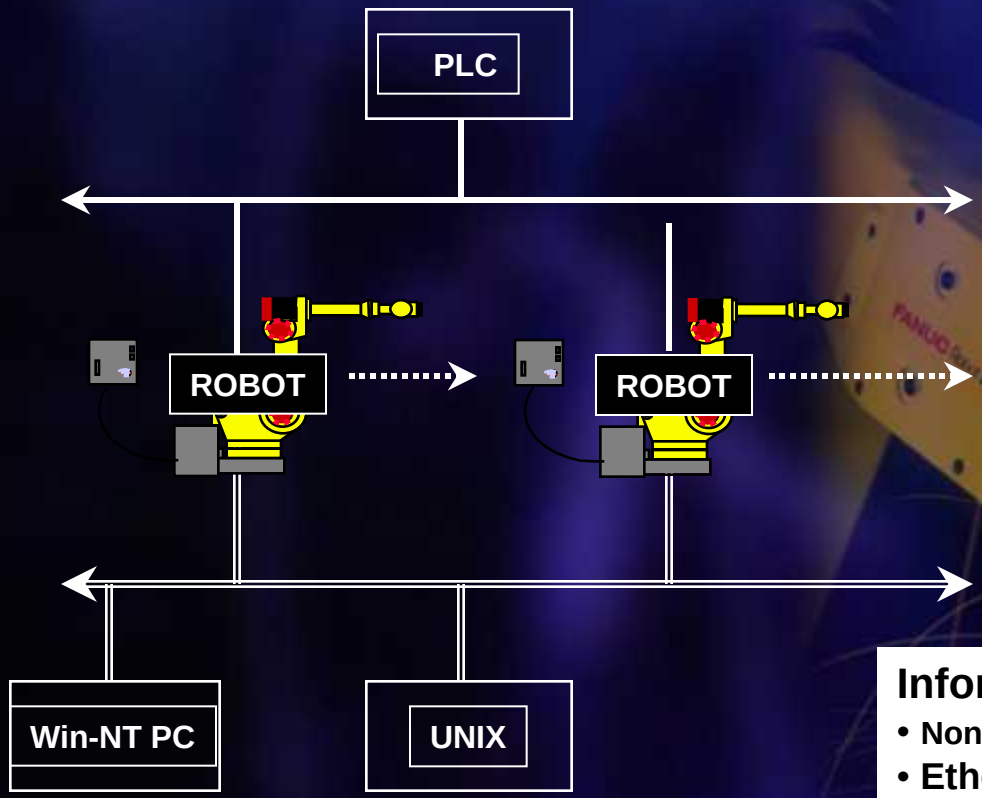
- DDCMP : Basic Communications
- MAP : Communications & Application
- MMFS : Application (Data and File Transfer)
- MMS : Application (Data and File Transfer)

All of the “legacy” products are not open or active standards based.

These technology solutions have been replaced by broad based, open definitions, with active support and updating by the standards organization.

Where Are We At Today?

EXAMPLE NETWORK ARCHITECTURE



Control Network : PLC-I/O

- **Deterministic response**
- AB-RIO
- Genius-RIO
- **DeviceNet - Robot Slave**
- **ControlNet - Robot Slave**
- **Profibus-DP - Robot Slave**

Local Robot I/O : Process Equipment

- **Deterministic response**
- FANUC Model-A Rack I/O
- FANUC Model-B Distributed I/O
- FANUC Process I/O
- **DeviceNet - Robot Master**
- **ControlNet - Robot Master**

Information Network : Files, Data

- **Non-deterministic response**
- **Ethernet, PPP, TCP/IP**
- **File Transfer Applications (FTP, TFTP/BOOTP)**
- **Terminal Sessions (Telnet)**
- Process Monitoring (PC-Interface)

How Are We Using Standards Today?

FTP

Capability

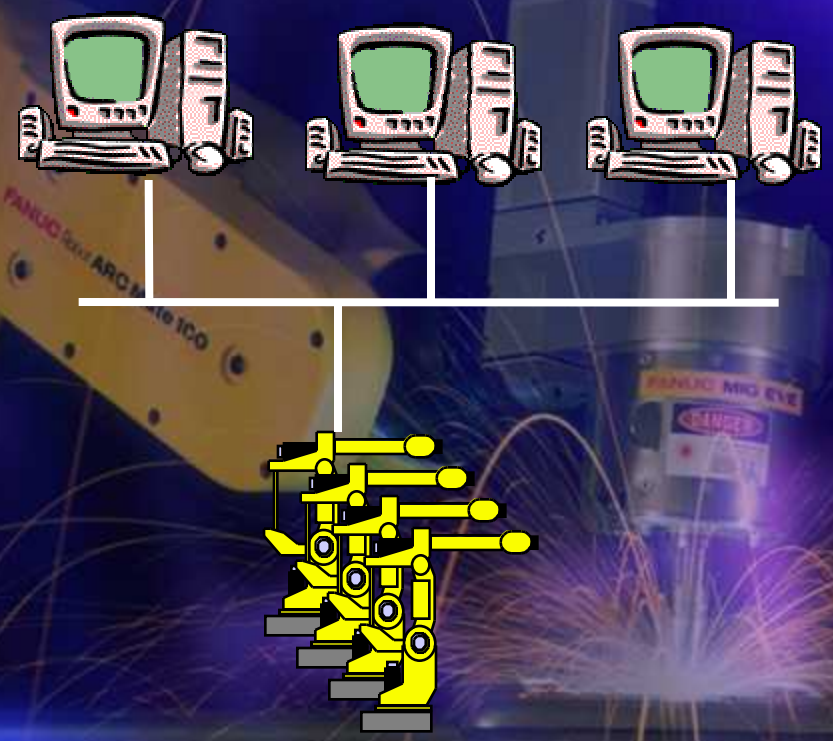
- Backup and Restore of production programs (assure good backups)
- File Transfer Between Robot and Factory Management System
- Client and Server functionality
  - automated backups through server
  - manual backup/restore through teach pendant

Advantages

- Software for Host is readily available across multiple platforms
  - basically plug and play
- Mapping of robot as a file store is very natural for use with host

Issues

- Security
- Version control



BOOTP/TFTP

Capability

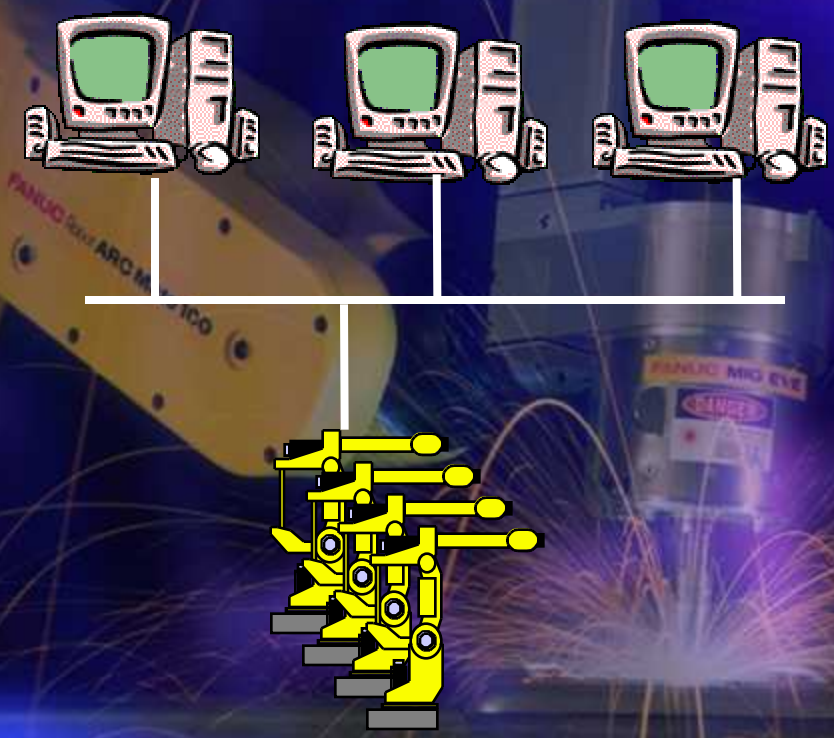
- Disaster Recovery of plant floor device
- Recovery includes getting network settings (BOOTP/DHCP) and then downloading complete image of device

Advantages

- Similar to “ghosting” a PC. Recovery includes kernel and loaded options minimizing recovery time
- Software for host is readily available across multiple platforms

Issues

- Point of initiation
- Version control
- Complexity on server - must be available and configured when needed



Telnet

Capability

- Interactive session with plant floor device (eg. setup, diagnostics, program review)
- Detailed troubleshooting can occur remotely for certain classes of problems

Advantages

- Software for host is readily available across multiple platforms
- Easy access from anywhere not just At the robot or cell PC

Issues

- Security
- Requires specific knowledge of the plant floor device being dealt with